

CLAIMS

1. A device for sensing a gas, the device comprising a plastics housing moulded in situ around at least one portion of a conducting lead frame, the housing defining an enclosure and being provided with means for enabling gas flow into the enclosure, and at least one gas sensitive element within the enclosure mounted to the conducting lead frame, wherein the conducting lead frame comprises connection leads which are accessible through, and are at least partially encapsulated by, the wall of the housing.
2. A device for sensing a gas, the device comprising at least one gas sensitive element contained within a flameproof, plastics housing supporting a flame arrestor which enables gas to flow into the interior of the housing, and the gas sensitive element(s) being connected to conducting leads which are accessible through, and are at least partially encapsulated by, the wall of the housing, the encapsulating wall having sufficient thickness such that the housing will not allow the propagation of an ignition source from within the device to the ambient atmosphere, under working conditions.
3. A device according to claim 2, wherein the plastics housing is fabricated by moulding in situ the plastics material directly around the conducting leads.
4. A device according to claim 2 or claim 3, wherein the flame arrestor is located above the gas sensitive element(s), the conducting leads being accessible, for example extending out, through a side wall of the housing.
5. A device according to claim 4, wherein the conducting leads are coupled with respective contacts located in an integral extension of the housing.
6. A device according to any of claims 2 to 5, wherein the conducting leads are provided by a conducting lead frame fabricated prior to encapsulation by the plastics housing.

7. A device according to any of claims 2 to 6, wherein the flame arrestor is a metal mesh.
8. A device according to any of claims 2 to 7, wherein the flame arrestor is joined to the plastics housing by a process of thermal bonding around its perimeter.
- 5 9. A device according to any of the preceding claims, further comprising at least one filter in order to remove contaminants from the gas flow into the device.
- 10 10. A device according to claim 9, which further comprises means for retaining components located outboard of the flame arrestor.
11. A device according to claim 10, wherein the retaining means is provided by a bezel which fastens mechanically to the housing.
- 15 12. A device according to any of claims 9 to 11, wherein the filter, or at least one of the filters, removes hydrogen sulphide from the gas flow into the device.
13. A device according to any of claims 9 to 12, wherein at least one of the filter(s) is inboard of the flame
- 20 arrestor.
14. A device according to any of the preceding claims, further comprising means for protecting one or more of the gas sensitive element(s) from shock damage.
15. A device according to any of the preceding claims,
- 25 further comprising means for insulating the gas sensitive element(s) and electrical connections, either in terms of electrical insulation or heat insulation, or both.
16. A device according to claims 14 and 15, wherein the protecting and/or insulating means comprise at least one
- 30 layer of shock absorbent and insulating material.
17. A device according to any of claims 14 to 16, wherein the shock absorbent and/or insulating material is glass wool.
18. A device according to any of the preceding claims,
- 35 further comprising a compensating element.
19. A device according to claim 18, wherein the detecting element comprises a catalytic bead.

20. A device according to any of the preceding claims, wherein the or each gas sensitive element and/or compensating element is positioned at least partly within a or a respective recess in an interior wall of the housing.

21. A device according to claim 20, wherein the or each recess also contains means for the protection and insulation of the gas sensitive element and/or compensating element positioned at least partly inside it.

22. A device according to any of the preceding claims, wherein the thickness of the portion of the housing wall through which the conducting leads extend is substantially at least 6 mm.

23. A device according to claim 1 or claim 6, which further comprises an electronic component mounted onto at least some of the portions of the conducting lead frame not covered by the plastics housing.

24. A device according to claim 23, wherein the electronic component is a memory component.

25. A device according to claim 24, wherein the electronic memory component is an EEPROM.

26. A device according to claim 24 or claim 25, wherein the electronic memory component stores data relating to the or each gas sensitive element.

27. A device according to any of the preceding claims, wherein the plastics housing comprises at least an inner portion and an outer portion, the outer portion being moulded around the inner portion.

28. A device according to any of claims 1, 6 or 23 to 27 which further comprises a cap which covers at least some of the portions of the conducting lead frame not covered by the plastics housing.

29. A device according to any of the preceding claims, wherein the or each gas sensitive element is a semiconductor gas sensor.

30. A device according to claim 29, wherein the or each semiconductor gas sensor comprises a p-type mixed metal oxide semiconducting material of the first, second and/or

third order transition metal series and wherein the semiconductor gas sensor is responsive to a change in concentration of carbon monoxide in the surrounding atmosphere and to a change in concentration of oxygen in the surrounding atmosphere.

31. A method of manufacturing a device for sensing a gas, the method comprising moulding a plastics housing in situ around at least one portion of a conducting lead frame such that the housing defines an enclosure, providing the housing with means for enabling gas flow into the enclosure, mounting at least one gas sensitive element inside the enclosure and connecting it to the conducting lead frame, and providing the conducting lead frame with connection leads which are accessible through, and at least partially encapsulated by, the wall of the housing.

32. A method according to claim 31, wherein the plastics housing is moulded around at least a portion of the conducting lead frame in two steps.

33. A method of manufacturing a device for sensing a gas, the method comprising moulding a plastics housing in situ directly around a set of conducting leads, mounting at least one gas sensitive element inside the housing and connecting it or them to the conducting leads which are accessible through, and at least partially encapsulated by, the wall of the housing, the encapsulating wall having sufficient thickness that the housing will not allow the propagation of an ignition source from within the device to the ambient atmosphere, under working conditions, and securing a flame arrestor to the housing which completes the flameproof enclosure yet enables gas to flow into the interior.

34. A method according to claim 33, wherein the flame arrestor is joined to the plastics housing by a process of thermal bonding around its perimeter.

35. A method according to any of claims 31 to 34, for constructing a device for sensing a gas according to any of claims 1 to 30.